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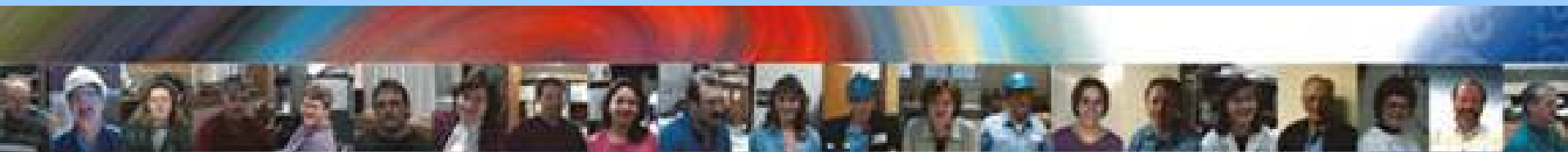
EERC Technology – Putting Research into Practice

# **Mercury Control Technology R&D Program Review**

**Pittsburgh, PA**

**July 14–15, 2004**

**Dennis Laudal, Chad Wocken, and Bob Wiemuth**



# Evaluation of Mercury Speciation at TXU's Coal-Fired Power Plants

## *Project Schedule*

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- Completion of sampling activities
  - June 2004
- Completion of draft final report
  - August 2004
- Completion of final report
  - November 2004



# ***Acknowledgments***

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**TXU Power: Bob Wiemuth**

**DOE/NETL: Bob Patton**

**EERC: Chad Wocken**

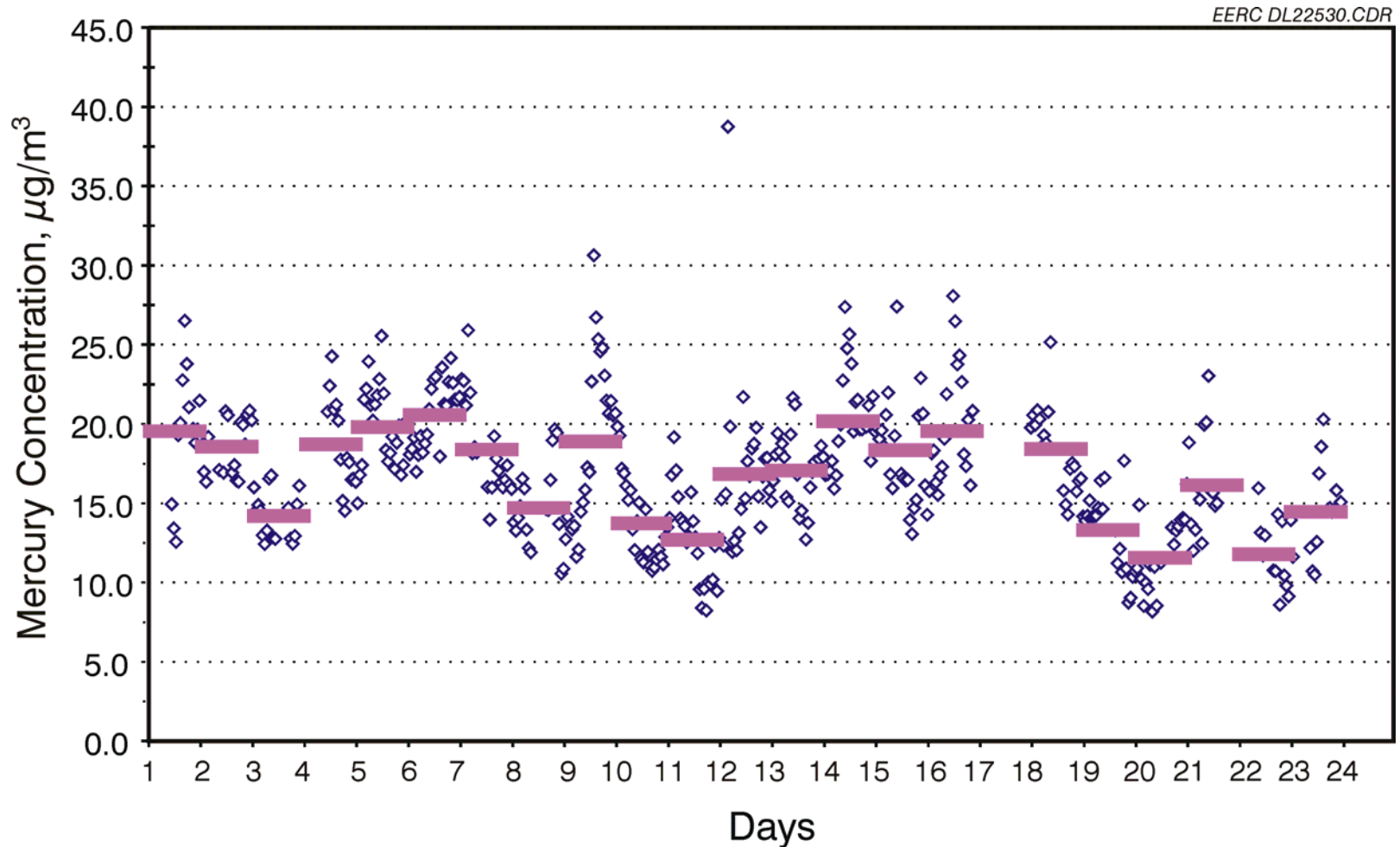
**ADA ES**

**Frontier Geosciences**

# Martin Lake



# ***Mercury Variability for a Texas Lignite***



## ***Project Goal***

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**Establish a comprehensive understanding of mercury speciation, emissions, and removal through existing air pollution control devices for five different TXU plant configurations.**

# ***Project Objectives***

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- Determine speciated mercury emissions at each of the plant configurations.
- Determine mercury removal for each pollution control device (mercury mass balance).
- Determine the effect of blending Texas lignite (TL) and Powder River Basin (PRB) coals on mercury speciation and emissions.

# ***Project Objectives***

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- Statistically evaluate the variability of coal mercury concentrations.
- Provide guidance and options to TXU in the development of a mercury control strategy.



# ***Plants Tested***

<b>Plant</b>	<b>Coal Type<sup>1</sup></b>		<b>SO<sub>2</sub> Control</b>	<b>Particulate Control</b>
	<b>Blend 1</b>	<b>Blend 2</b>		
Big Brown Unit 1	100% PRB	70% TL and 30% PRB	None	ESP and fabric filter <sup>2</sup>
Monticello Unit 1	30% TL and 70% PRB	50% TL and 50% PRB	None	ESP and fabric filter <sup>3</sup>
Monticello Unit 3	50% TL and 50% PRB	30% TL and 70% PRB	Wet FGD	ESP
Sadow Unit 4	100% TL	—	Wet FGD	ESP
Martin Lake Unit 3	70% TL and 30% PRB	100% TL	Wet FGD	ESP

<sup>1</sup>Coal blend used was for testing purposes only

<sup>2</sup>ESP and fabric filter in series (COHPAC™ configuration).

<sup>3</sup>ESP and fabric filter in parallel.

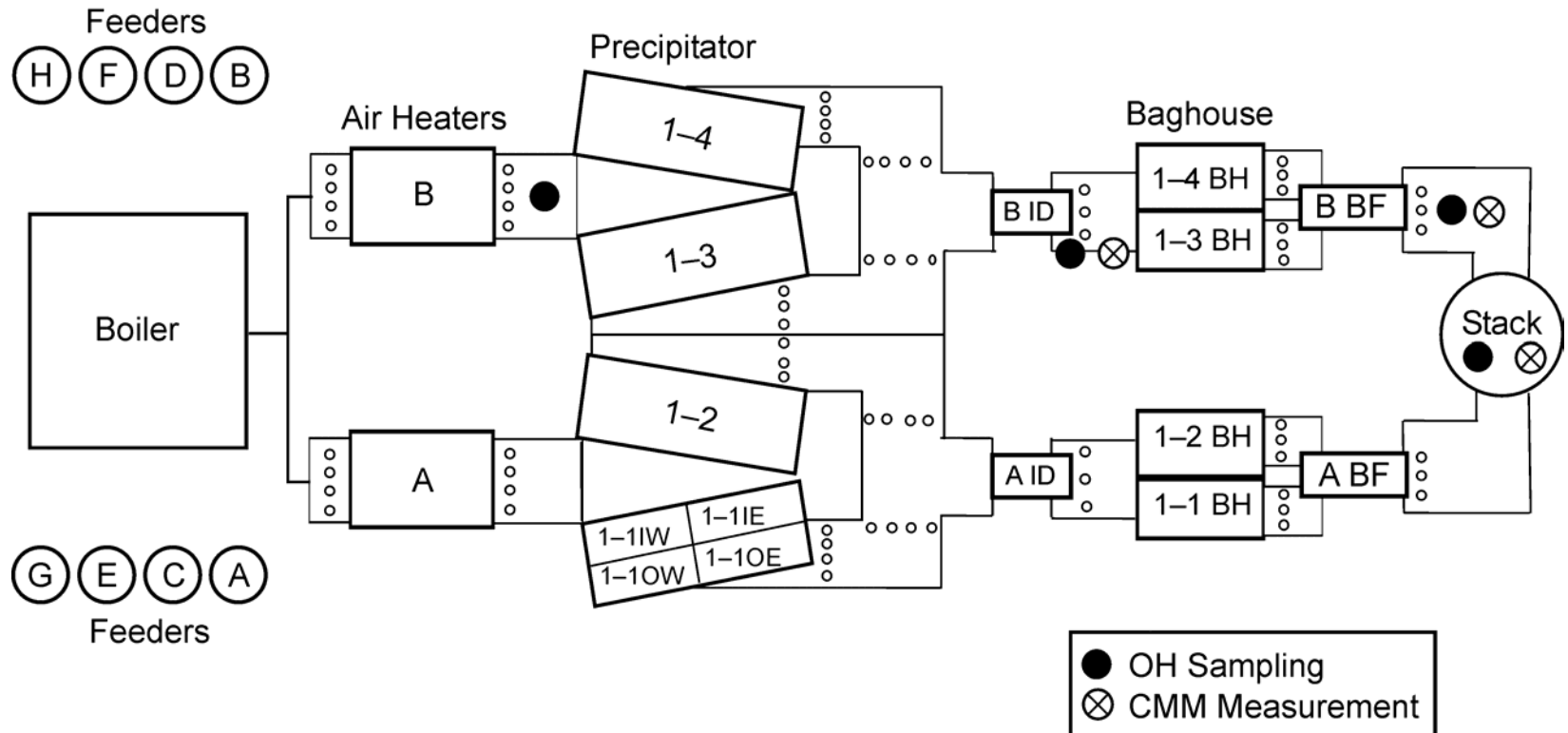
# ***Flue Gas-Sampling Methods***

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- Ontario Hydro method – ASTM D6784-02
  - All sample locations
- CMMs – PS Analytical, Tekran, Nippon
  - All locations after the the particulate control device
- EPA Method 324 (Quick CEMs)
  - Stack

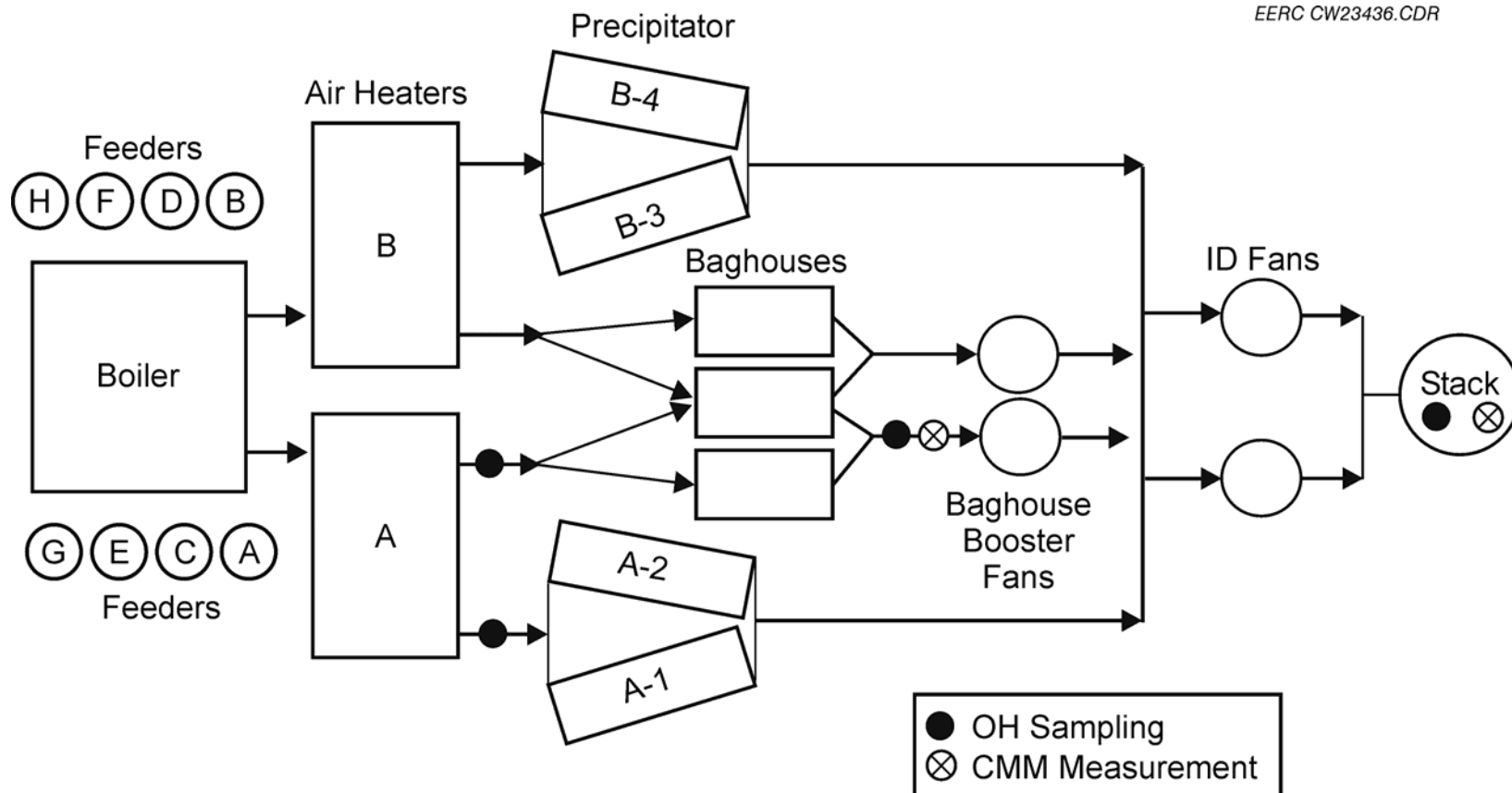
# Big Brown Unit 1 Sampling

EERC CW23429.CDR



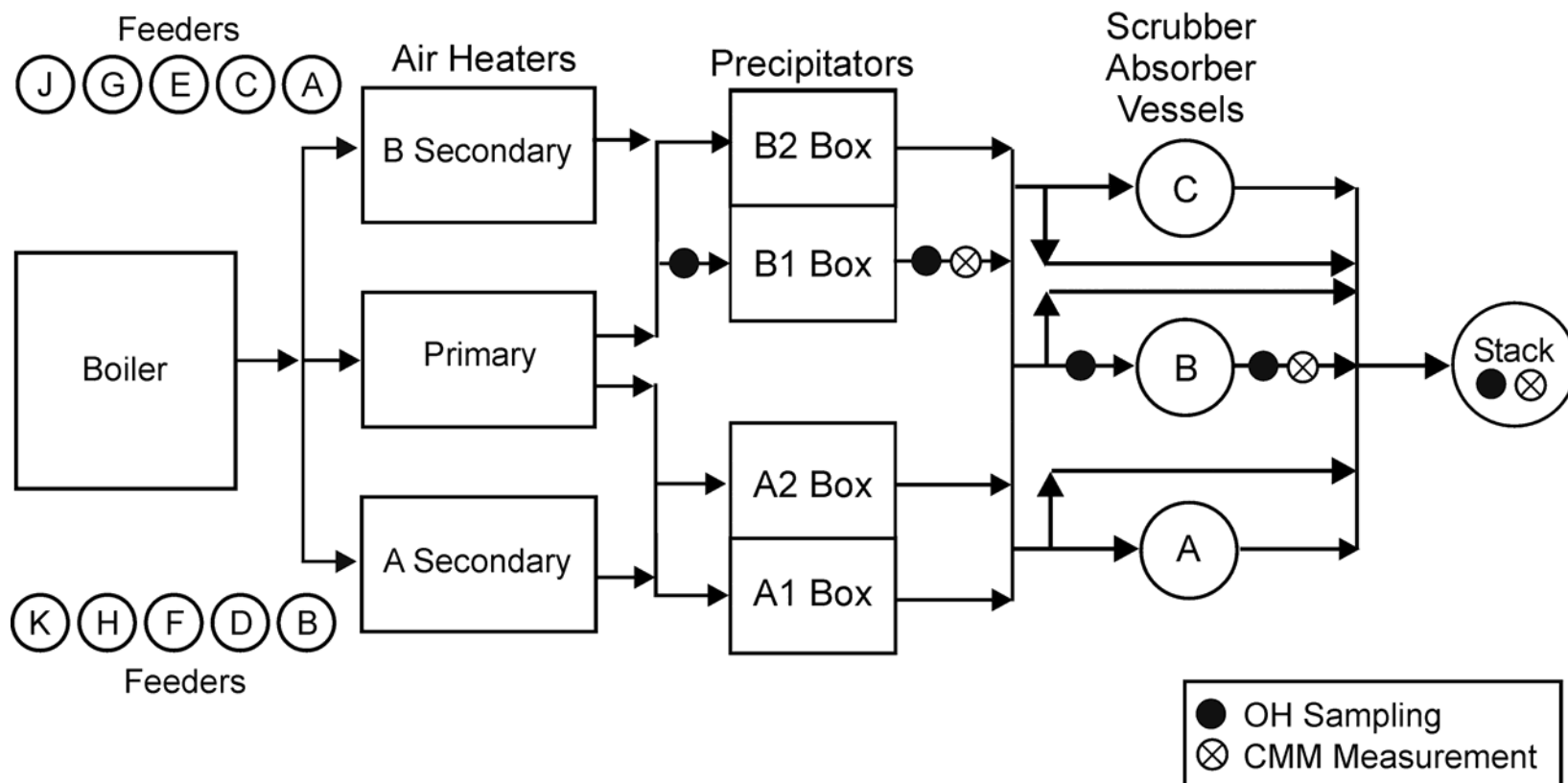
# Monticello Unit 1 Sampling

EERC CW23436.CDR



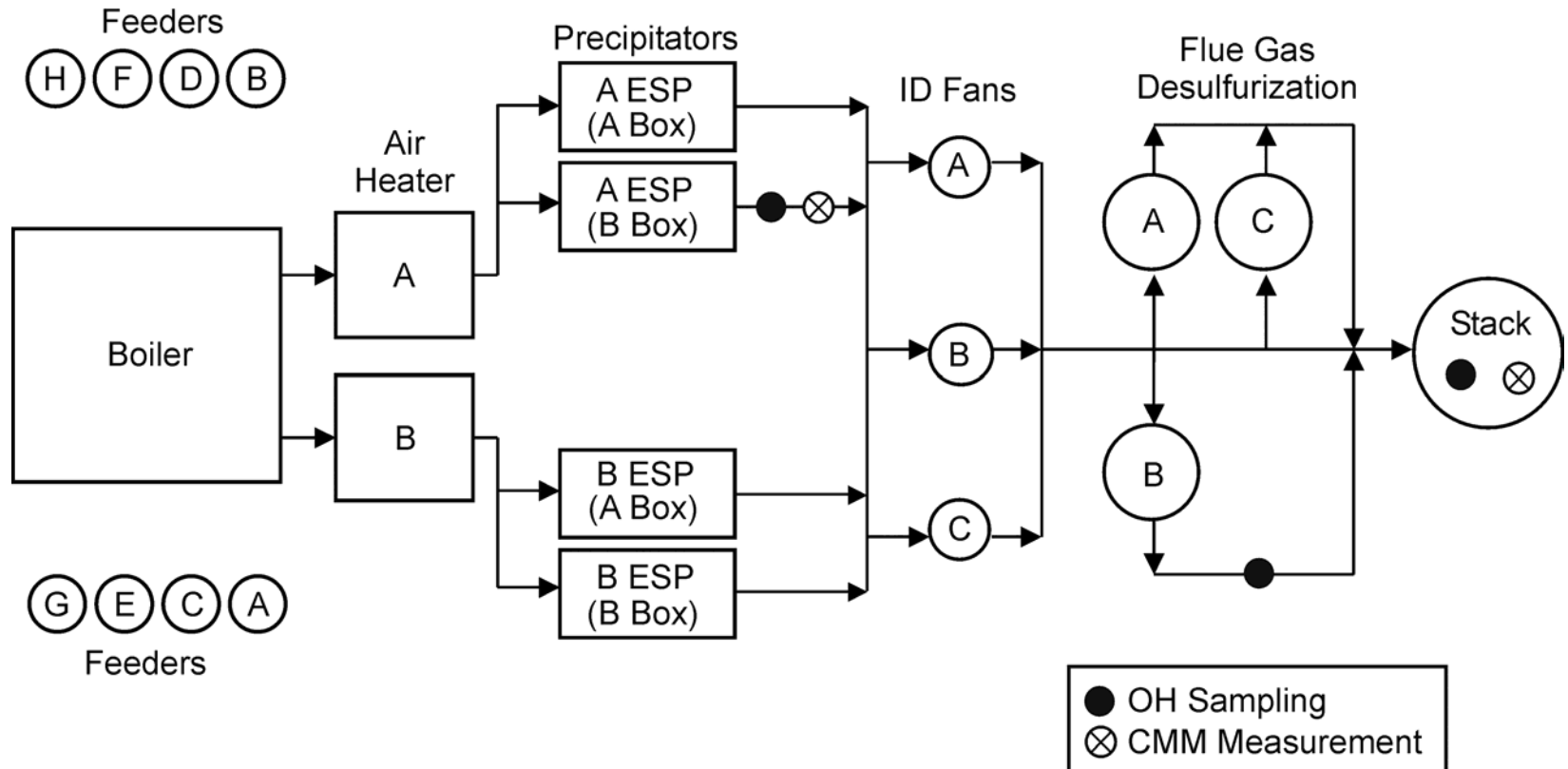
# Monticello Unit 3 Sampling

EERC CW23438.CDR



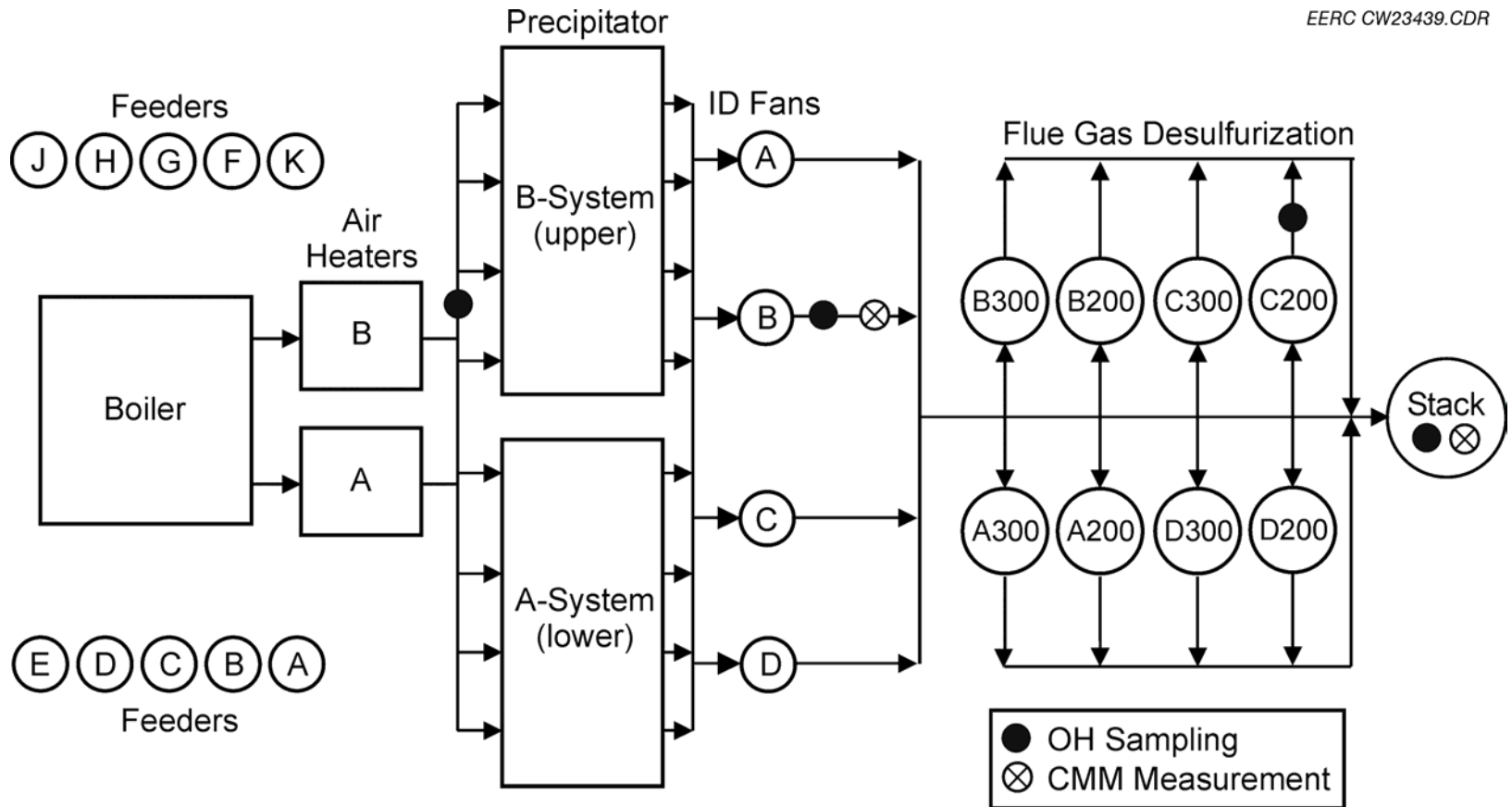
# Sadow Unit 4 Sampling

EERC CW23437.CDR



# Martin Lake Unit 3 Sampling

EERC CW23439.CDR





## ***Mercury Mass Balance Determinations***

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- A mercury mass balance will be completed for each pollution control device:

$$\mathbf{Hg_{in} = Hg_{collected} + Hg_{out}}$$

- An overall mass balance will also be calculated:

$$\mathbf{Hg_{coal} = Hg_{collected} + Hg_{stack}}$$

Where is efficient is each individual pollution control device for removing mercury from the flue gas stream.



# ***Samples Collected***

- Coal samples
- ESP hopper ash samples
- Baghouse hopper ash samples
- Wet FGD samples
- Other samples
  - FGD makeup water
  - Pyrite rejects
  - Lime/limestone

# ***Coal Samples***

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- Mercury
- Chlorine
- Ultimate
- Short proximate

Composite coal samples from the feeders will be collected daily from each unit.

At two of the units, the individual feeders will be analyzed to determine variability in the coal.

# ***ESP and/or Baghouse Samples***

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- Mercury
- Loss on ignition

Prior to sampling, the ESP and/or baghouse  
hoppers will be emptied.

# ***Wet FGD Samples***

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- Percentage solids
- Mercury in liquid per blend
- Mercury in solids

Data to be used to partition mercury in wet FGD samples and to determine mass balances.